

AKS - A Simplified Keratoconic Fitting Approach

We receive up to 30 calls a day from practitioners in various stages of a keratoconic GP lens fitting. The one consistent factor that we have seen with keratoconus is this – there is no consistency! Cones come in all shapes, sizes and positions, and successful fitting can require a magnitude of design variations.

A myriad of keratoconic fitting philosophies and designs flood the marketplace, and many have proven success for a number of patients. However, the need to alter a design from its specified parameters in order to customize the fit is also common. Recognizing this, our consultation department has developed a strategy for fitting cones that has proven to be successful in a broad range of cases.

Without question, the easiest way to fit a cone patient is by utilizing corneal topography. This is the best way to see the shape, steepness, size and position of the cone. With corneal topography, the best course of action can be quickly identified, paving the way to a successful fit in a very short period of time.

Art Optical developed an easy approach to fitting oval and nipple type cones by using the “yellow rule.” When evaluating the topographical map with a normalized scale, which shows the curvature of the cornea in colors, from red (steeper) to blue (flatter), we noted that the majority of successful fits had base curves that were equal to the yellow area of the map. The yellow area surrounds the steeper red area, which represents the apex of the cone. The “yellow rule” simply implies that the base curve selected as the starting point for a cone fit should be equal to the dioptric value associated with the yellow area of the color map. We should note here that this should be done using an axial map versus a tangential map. The axial map will provide a more blended view of progressive curvature change and is more useful in fitting cones than a tangential map.

When using the “yellow rule” to determine the base curve from corneal topography, the typical diameter used will be 8.5mm and the optical zone diameter should be relatively equal to the base curve. For example, if the base curve determined is 52.00 diopters or 6.49mm, specify the optical zone diameter as 6.5mm with an overall diameter of 8.5mm. Keeping the optical zone diameter relatively close to the base curve will prevent mid-peripheral seal off and allow proper tear exchange across the center of the lens.

When corneal topography is not available, the fitting process can be enhanced with the use of a cone fitting set. As noted in the beginning of this article, there are many designs developed specifically for keratoconus patients, such as Soper and McGuire. They both have their strong points and can be successful; however, in many cases we have found it necessary to deviate from the standard parameters to customize the design for individual patients. As a result of noting why and when these designs needed to be customized, we developed the AKS loaner cone set system.

AKS, Art Keratoconic System, is a simplified approach to diagnostically fitting cones. There are two variations of the set available for loan, standard and extended range. The set chosen will depend upon the range of corneal curvature noted from keratometry. If the flat K is 45.00 to 54.00 diopters, the standard set should be used. If the flat K is steeper than 54.00 diopters, the extended range set is recommended.

The AKS sets have a consistent diameter of 8.5mm. The standard set has base curves from 7.20mm to 6.00mm in .10mm steps. The power on the 7.20mm base curve is -6.00 and increases by -0.50 for each base curve,

ending with a final power of -12.00 at the 6.00mm base curve. In the extended range set, base curves range from 6.20mm to 5.00mm in .10mm steps with powers ranging from -11.00 at 6.20mm to -17.00 at the 5.00mm base curve.

The key to success with the AKS design is the control of the optical zone diameter. The optical zone is decreased as the base curves steepen. The smaller OZ allows the apex of the cone to be fit with a mild central touch while avoiding mid-peripheral seal off.

When using the AKS diagnostic set, begin with a base curve that is approximately two diopters steeper than the flat K. Observe the fluorescein pattern and note the amount of central touch and mid-peripheral clearance present. The optimum fit will show approximately 1-2 mm of central touch, a ring of pooling just outside the touch pattern, and a mid-peripheral touch pattern that does not equal 360°. It is the mid-peripheral touch pattern that is most critical in the design. You need to avoid 360° or a complete ring of bearing in the mid-periphery to insure you are not sealing off the central tear flow. When using the AKS set, we recommend that you continue to trial incrementally steeper base curves until you see a pattern that is too steep. Then, order the next flatter base curve from that steeper pattern. This will assure that you have an acceptable fit that does not seal off the mid-periphery and will remain adequate in fit relationship as the cone continues to progressively steepen from the disease.

Our customers who have used the AKS system and have followed the recommended trial procedure have been highly successful with their cone fits. Coming up with the final lens power is also easy due to the progressively higher minus powers for each base curve. In most cases, the over-refraction is less than three diopters plus or minus and the patient notes good acuity even before the over-refraction is done.

Our consultation department is always available to assist you with keratoconic lens fitting. If it at all possible, we recommend having topography done to aid in the fitting process. If topography is not available, then we strongly recommend the use of our AKS diagnostic set, available for sale or loan. For additional information on cone fitting, feel free to call one of our certified fitting consultants at 800-566-8001.

